sitive trap, and when touched, however lightly, by the fly or other object (as a hair, for example), the opposing, separated, parallel, and hard edges instantaneously close like pincers, and the prey is secured.

Stapelia belongs to the Asclepiadacea, and analogous sensitive organs attached to the pollen masses exist in other genera, and perhaps in all that natural order. We have probably no other vegetable fly-catcher so instantaneous in its action as the organ he had described, and he could therefore confirm Mr. Burk's observation.

Sensitive Organs in Asclepias.—Mr. Edward Potts stated that, at the suggestion of Dr. Hunt, he had examined such species of the genus *Asclepias* as were within his reach, with the view to determine whether a sensitiveness and contractile power existed in the dark gland-like bodies associated with their pollen masses, similar to those which Dr. Hunt had discovered in *Stapelia*. On account of the lateness of the season, his observations were limited to the *A. incarnata*, native, and a cultivated species, the *A. curassavicum*, and, as these were identical as to the points under examination, his description would be understood to apply to both. The accompanying wood-cut (Fig. 1) clearly shows the position and form of the so-called glands (which may be easily seen on the flower by the aid of a pocket magnifying glass), near the extremity of the pistil, just peeping out from beneath the mantles of adjacent anthers. These latter are closely adherent to the pistil, or more properly to its stigma, and when separated therefrom present, on the under side, the appearance he had endeavored to show in fig. 2, of a pair of sacks or cases in which the pollen masses are suspended, left open at the top apparently with a view to facilitate their withdrawal. The sensitive glands are placed in shallow depressions upon the perpendicular columnar ridges of the stigma, and seem to be attached to it by a very delicate, easily ruptured membrane. Fig. 3 represents one of these as connected by somewhat broad and twisted filaments, with the two adjacent pollen masses of neighboring anthers, not those belonging to the same. In this sketch he had endeavored to represent it as open and expectant, and in fig. 4, as firmly grasping a slender hair. The fact of the removal of these groups by insect agency has been frequently mentioned; his ex

Fig. 1.

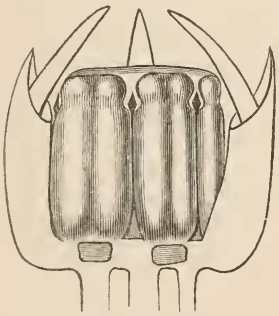

Fig. 2.

periments have been made to determine whether the glands themselves took an active part in the matter.

As these species seemed to present few attractions to the insect world, and received but few such visitors, he was compelled to use both force and strategy to accomplish his ends. He at first tried to insert a human hair while observing the gland under the microscope, but failed, on account of the relatively large size of the hair and the difficulty of manipulating it where all directions were reversed. His next plan was more successful; he caught house flies and held them by the wings above the flowers, allowing their feet to scramble over them. Almost immediately one or more of these would become ornamented by groups of the glands and pollen masses which clung so closely that their later struggles and rubbings failed in any case to detach them. The experiment of course was less conclusive as to the active agency of the gland than that mentioned by Dr. Hunt, where in the *Stapelia*, it closed on the hairs clothing the proboscis of its prey. To avoid the objection that the hooks and spines upon the insect's legs caught and drew out the glands by friction, he tried a modification of his first experiment. Taking a fine camel's hair pencil, he brought its end gently, perpendicularly upon the summit of the flower, sometimes without special guidance and sometimes directing some of its hairs towards a particular gland. In a few moments one of the many hairs would touch the sensitive inner surface of a gland, causing it instantly to contract and cling to the hair, which tore it loose from the stigma. The pollen masses uniformly remaining attached to it by their filaments were withdrawn with it; and the whole have, in nearly every case, remained together during all the manipulation required in the preparation and mounting of them as microscopic objects. It is noticeable that the glands remain open and susceptible long after plucking the flowers; in fact until they are nearly withered. In a recent case he carefully examined each gland upon one flower of a group which had been gathered twenty-four or forty-eight hours, under a power of fifty diameters, and found them in this condition; then, with a camel's hair pencil, but without violence, he removed the whole five, and again viewing them, the change in position of the jaws in every case was very observable.

Fig. 3.

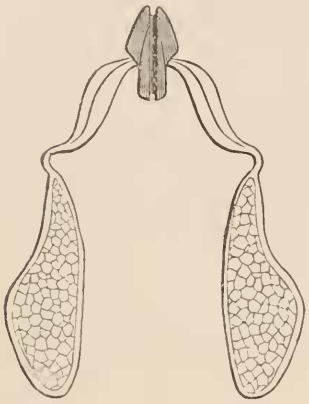

Fig. 4.

If it should be conceded from the result of these experiments that there is at least a probability that motion can thus be excited in these glands, it will appear further that the withdrawal of the pollen masses is so far within the plan of creation, that it has not been left to the accident of occasional entanglement in the legs of insects. But to what end is this rude withdrawal? The fertilization of the plant by their rupture upon the edges of the stigma is a very natural suggestion.

But doubt is thrown upon the necessity for this exceptional method of fertilization when we notice the existence of a still more extraordinary one mentioned by Dr. Gray. If we dissect and carefully examine a thoroughly matured flower just before its stigma and surrounding anthers have fallen, we will probably find some of the pollen masses materially modified in appearance from their earlier condition, and sending forth, always from their inner, more convex edge, a great bunch of pollen tubes which penetrate the stigma at its lower extremity where it joins the apex of the styles. In this view, its fertilization, instead of being, as it would appear at first glance, practically impossible without external help, seems almost absolutely certain, failing where our insect friends or some other form of violence may have extracted all the pollen masses before their tubes were protruded, or where the latter may have failed to appear on account of the prior drying of the stigmatic surface.

In this connection he would refer to a recent observation in which the facts, though far too few to establish a rule upon the question, yet, so far as they go, tend to confirm the opinion of Robert Brown, as drawn from his own experience, viz., that fertilization in this family of plants *does* depend largely upon insect agency. In three instances Mr. Potts had noticed upon flowers of *A. curassavicum*, beside their own normal features, another sensitive gland and its attached pollen masses, which must have been brought there by some external agency. In each case one mass of the pair had been inserted under the edge of an anther in the immediate vicinity of another pollen mass occupying its natural position; that is, while the latter was *in*, the former was *under* the antheridial sack, and of course close against the sloping lower surface of the stigma. The first found of these three instances was not examined more particularly, but the other two forming parts of separate groups of flowers upon the same stem, were marked, the twig kept alive in water for several days to allow time for the formation of pollen tubes, and then carefully dissected. It is worthy of remark that by this time every other flower of each group had withered and fallen, leaving these alone. On dissection it was found that each of these inserted pollen masses had thrown forward a profusion of pollen tubes towards the point of junction of the stigma with the extremities of the styles; and though he could not detect their entrance into the latter, fertilization had probably been effected as the ovaries had noticeably increased in size.

None of the masses which occupied their natural position had formed tubes, though in several a strongly marked granulation and tendency to rupture appeared in those cells adjoining the convex inner edge.

If it be allowable to deduce a theory from the observation of so few facts, when these are confirmed by so high an authority as Robert Brown, he would suggest that while there is no imperative physical obstacle to self-fertilization in these plants, the inner membrane of the anther being cut away apparently for the purpose of promoting or allowing it (as seen in fig. 2), yet the maturity of the pollen masses is reached so late that the stigma of the same flower has frequently lost its susceptible condition as to moisture, etc., before that period arrives. When, however, the pollen masses pertaining to one of the earlier flowers are removed by insects and lodged in the position above described upon another just opened, they find and respond to the more favorable circumstances, and cross-fertilize that flower.

A *motif* is thus suggested for the sensitive character noticed in the above described glands, and the care taken, by this means, to insure the frequent transplantation of the pollen masses into other flowers.

Dowling Benjamin, M.D., was elected a member.

The following paper was ordered to be published:—